



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/591,060	08/30/2006	Ryusuke Fujiyoshi	DK-US040214	6483
22919 7590 03/18/2010 GLOBAL IP COUNSELORS, LLP 1233 20TH STREET, NW, SUITE 700 WASHINGTON, DC 20036-2680				
EXAMINER				
ROGERS, LAKIYA G				
ART UNIT		PAPER NUMBER		
3744				
MAIL DATE		DELIVERY MODE		
03/18/2010		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/591,060

**Applicant(s)**

FUJIYOSHI ET AL.

**Examiner**

LAKIYA ROGERS

**Art Unit**

3744

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 November 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 2-38 is/are pending in the application.
- 4a) Of the above claim(s) 3, 5-8 and 19-38 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2, 4, 9-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

This Office Action is in response to the amendments and remarks filed on 11/25/2009. Claim 1 has been cancelled. Claims 2, 4, and 9-18 remain pending. The double patenting rejection has been withdrawn in light of the amendments.

#### *Claim Rejections - 35 USC § 103*

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. **Claims 2, 4, 12-13** are rejected under 35 U.S.C. 103(a) as being unpatentable over Rhodes (US 4793143).

**Regarding claim 2**, Rhodes teaches in Fig. 9 an air conditioning system capable of treating a latent heat load and a sensible heat load in a room by performing a vapor compression refrigeration cycle operation comprising: a plurality of first utilization side refrigerant circuits (indicated as "A" in annotated Fig. 9 below) each having an absorbent heat exchanger (12,14) provided with an adsorbent on a surface thereof capable of alternating between an absorption process in which moisture in air is adsorbed onto the adsorbent by causing the adsorbent heat exchanger to function as an evaporator that evaporates refrigerant (Col. 17, lines 15-23) and a regeneration process in which moisture is desorbed from the adsorbent by causing the adsorbent heat exchanger to function as a condenser that condenses the refrigerant and connected in parallel with one another (Col. 11, lines 63-67); and a plurality of second utilization side refrigerant circuits (indicated as "B" in annotated Fig. 9 below) capable of exchanging heat between refrigerant and air and connected in parallel with one another, the first utilization side refrigerant circuits being capable of supplying a room with air that passed through the adsorbent

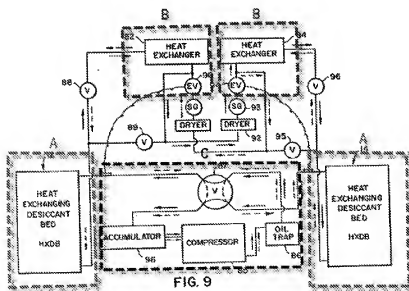
heat exchanger and the second utilization side refrigerant circuits being capable of supplying a room with air that passed through the heat exchangers; a heat source side refrigerant circuit (indicated as "C" in annotated Fig. 9 below) including a compression mechanism (85); the first utilization side refrigerant circuits being connected to a discharge gas connection pipe (piping between compressor 85, oil trap 86, and valve 87) connected to a discharge side of the compression mechanism (85) and being connected to an inlet gas connection pipe (piping between valve 87 and accumulator 96) connected to an inlet side of the compression mechanism (85, by way of piping and accumulator).

Rhodes fails to explicitly teach a heat source side heat exchanger in the heat source side refrigerant circuit.

However, it would have been obvious to a person of ordinary skill in the art at the time of invention to modify the system of Rhodes to replace the accumulator (96) with a heat exchanger in order to ensure that mixed phase refrigerant is in the liquid phase before being sent to the inlet of the compressor. A person of ordinary skill in the art at the time of invention would recognize that incorporating a heat exchanger in this manner will ensure any gas of a mixed phase refrigerant is condensed before entering the compressor in order to prevent compressor damage in turn maximizing the life of the compressor.

Therefore it would have been obvious to a person of ordinary skill in the art at the time of invention to modify the system of Rhodes to replace the accumulator in the heat source side refrigerant circuit with a heat exchanger in order to prevent compressor damage and in turn maximize the life of the compressor.

The limitations "...configured to treat..."; "...configured for alternating..."; "...configured for exchanging heat..."; "...only the compression mechanism of the compression mechanism and the heat source side heat exchanger being used..." have all be considered recitations of intended use. It has been held that the recitation with respect to the matter in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex part Masham*, 2 USPQ2d 1647 (1987). For clarity the recitation, "...only the compression mechanism of the compression mechanism and the heat source side heat exchanger being used in common with the first and second utilization side refrigerant circuits..." has been considered intended use because it is the Examiner's position that this recitation is only applicable when the system is in operation.



**Regarding claim 4**, Rhodes as modified above teaches the invention as recited above and further teaches that the second utilization side refrigerant circuits ("B") are connected to a liquid connection (piping between heat exchangers 82,84 and desiccant heat exchangers 12,14

depending on operating mode) that is connected to a liquid side of the heat source side heat exchanger (by way of piping and valve 87) and switchably connected to the discharge gas connection pipe and the inlet gas connection pipe through a switching mechanism (valve 87).

**Regarding claim 12**, Rhodes as modified teaches the invention as recited above and further teaches that a switching time interval between the adsorption process and the regeneration process in the adsorbent heat exchanger is changeable.

Although not explicitly taught, Rhodes teaches that the system operates alternatively in the adsorbing and desorbing operating modes (Col. 11, lines 63-67). Rhodes further teaches that when the desiccant bed modules are saturated in excess of 40% by weight of the desiccant material, the system reverses and cycles through an adsorption phase (Col. 12, lines 8-15).

Therefore, a person of ordinary skill in the art at the time of invention would recognize that amount of time that it takes for the desiccant bed modules to become saturated in excess of 40% by weight of the desiccant material varies based on the conditions of the air. In turn, Rhodes implicitly teaches that a switching time interval between the adsorption and regeneration processes is changeable based on the properties of the air.

**Regarding claim 13**, Rhodes as modified teaches the invention as recited above and further teaches that at system startup a room is supplied with air passed through the air heat exchanger and outdoor air is prevented from passing through the adsorbent heat exchanger (Col. 17, lines 6-12 and Col. 11, lines 52-62).

Although not explicitly taught, a person of ordinary skill in the art at the time of invention would recognize that the system supplies air to a room at startup because Rhodes does not make a distinction, implicitly or otherwise, between operation at startup and continuous

operation. Therefore, it is understood that the system operates in the same manner at both startup and during continuous operation.

3. **Claims 9-11** are rejected under 35 U.S.C. 103(a) as being unpatentable over Rhodes (US 4793143) in view of Worthington (US 4984433).

**Regarding claim 9**, Rhodes as modified teaches the invention as recited above but fails to explicitly teach that the air conditioning system is configured to calculate a required latent heat treatment capacity value and a required sensible heat treatment capacity value in order to control an operational capacity of the compression mechanism based on a required latent heat treatment capacity value and a required sensible heat treatment capacity value.

However, Worthington teaches an air conditioning system that has a first sensor monitoring the dry bulb temperature and a second sensor monitoring the moisture content of the air, and both sensors communicate the monitored data to a microprocessor that adjusts the system to achieve the desired air temperature properties (Col. 2, lines 42-56). Worthington further teaches that the microprocessor evaluates the data and adjusts the system based upon the condition of the air being treated and energy requirements are thereby minimized (Col. 2, lines 53-56). Although not explicitly taught, a person of ordinary skill in the art at the time of invention would recognize that the microprocessor is capable of calculating the required sensible and latent capacity value in order to adjust the system based upon the condition of the air being treated.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to modify the system of Rhodes to be capable of calculating a required latent heat

treatment capacity value and a required sensible heat treatment capacity value in order to control an operational capacity of the compression mechanism based on a required latent heat treatment capacity value and a required sensible heat treatment capacity value in order to provide for a more energy efficient system in view of the teaching of technique by Worthington.

**Regarding claim 10**, Rhodes as modified above teaches the invention as recited above and Worthington further teaches that the air conditioning system is capable of calculating a target evaporation temperature and a target condensation temperature of the system as a whole based on a required latent heat treatment capacity value and the required sensible heat treatment capacity value in order to control the operational capacity of the compression mechanism based on a target evaporation temperature and a target condensation temperature.

Although not explicitly taught, Worthington teaches an air conditioning system that has a first sensor monitoring the dry bulb temperature and a second sensor monitoring the moisture content of the air, and both sensors communicate the monitored data to a microprocessor that adjusts the system to achieve the desired air temperature properties (Col. 2, lines 42-56). Worthington further teaches that the microprocessor evaluates the data and adjusts the system based upon the condition of the air being treated and energy requirements are thereby minimized (Col. 2, lines 53-56). A person of ordinary skill in the art at the time of invention would recognize that the system taught by Worthington determines enough of the psychometric properties of the air in the conditioned space in order to be capable of operating the air conditioning system as recited above.

**Regarding claim 11**, Rhodes as modified above teaches the invention as recited above and Worthington further teaches that the air conditioning system is capable of calculating an



evaporation temperature difference between the target evaporation temperature and an evaporation temperature and to calculate a condensation temperature difference between the target condensation temperature and a condensation temperature in order to control the operational capacity of the compression mechanism based on the evaporation temperature difference and the condensation temperature difference.

Although not explicitly taught, Worthington teaches an air conditioning system that has a first sensor monitoring the dry bulb temperature and a second sensor monitoring the moisture content of the air, and both sensors communicate the monitored data to a microprocessor that adjusts the system to achieve the desired air temperature properties (Col. 2, lines 42-56). Worthington further teaches that the microprocessor evaluates the data and adjusts the system based upon the condition of the air being treated and energy requirements are thereby minimized (Col. 2, lines 53-56). A person of ordinary skill in the art at the time of invention would recognize that the system taught by Worthington determines enough of the psychometric properties of the air in the conditioned space in order to be capable of operating the air conditioning system as recited above.

4. **Claim 14** is rejected under 35 U.S.C. 103(a) as being unpatentable over Rhodes (US 4793143) in view of Maeda (US 6205797) and Belding et al. (US 6050100).

**Regarding claim 14**, Rhodes as modified teaches the invention as recited above but fails to explicitly teach that at system startup, in a state in which switching between the adsorption process and the regeneration process in the plurality of adsorbent heat exchangers is stopped, outdoor air is passed through one of the plurality of adsorbent heat exchangers and then is exhausted to the outside, and also room air is passed through an adsorbent heat exchanger among

the plurality of adsorbent heat exchangers, besides the one through which the outdoor air is passed, and then is supplied to a room again.

However, Maeda teaches in Fig. 5 an air conditioning system incorporating the equivalent technique of adjusting the flow rate of the regeneration air (outside air) in proportion to the rotational speed of the compressor, which is increased, at the startup of the system (Col. 12, lines 33-43) and also passing room air (process air) through an adsorbent heat exchanger (103) and then supplying the air to a room again (airflow 112). Maeda further teaches that this technique is used at startup when the desiccant is loaded with moisture and the desorbing capability has been degraded (Col. 12, lines 33-36). A person of ordinary skill in the art at the time of invention would recognize that the technique taught by Maeda is equivalent to the technique claimed because they both allow the system to compensate for the large amounts of moisture retained when the system was not operating in order to make sure the system has the capacity to adequately condition air introduced to the system at startup.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to pass outdoor air through one of the plurality of adsorbent heat exchangers and then is exhausted to the outside and room air is passed through an adsorbent heat exchanger and passing room air through an adsorbent heat exchanger and then supplying it to a room again at system startup in view of the teaching of the equivalent technique by Maeda in order to compensate for the large amounts of moisture retained by the adsorbent when the system was not operating for a more efficient system at startup.

As modified, Rhodes fails to explicitly teach that the room air is passed through an adsorbent heat exchanger besides the one through which the outdoor air is passed.

However, Belding teaches in Figs. 1 and 6 an air conditioner system having a desiccant wheel (8) made up of four heat exchanging sections (quadrants I-IV; Col. 9, lines 18-33). Belding further teaches that this configuration results in drier air which results in greater heat exchange capacity (Col. 9, lines 35-52).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to further modify the system of Rhodes to include a desiccant heat exchanger having four heat exchanging sections in order to result in drier air for a greater heat exchange capacity in view of the teaching of the technique by Belding.

A person of ordinary skill in the art at the time of invention would further recognize that as modified, the room air is passed through an adsorbent heat exchanger (one of the quadrants I-IV) besides the one through which the outdoor air is passed.

5. **Claim 15** is rejected under 35 U.S.C. 103(a) as being unpatentable over Rhodes (US 4793143) in view of Maeda (US 6205797).

**Regarding claim 15**, Rhodes as modified teaches the invention as recited above but fails to explicitly teach that at system startup, a switching time interval between the adsorption process and the regeneration process in the adsorbent heat exchanger is made longer than that during normal operation.

However, Maeda teaches the equivalent technique of bypassing process air so as to suppress moisture adsorption on the desiccant while allowing the desiccant to be regenerated at startup (Col. 6, lines 52-61). A person of ordinary skill in the art at the time of invention would recognize that the technique taught by Maeda is equivalent to the technique as claimed because they both allow the system to adjust in order to compensate for the large amounts of moisture

retained by the adsorbent when the system was not operating in order to make sure the system has the capacity to adequately condition air introduced to the system at startup. Maeda further teaches that this technique improves the startup characteristics of the system (Col. 6, lines 52-61).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to modify the system of Rhodes to make the switching time interval between the adsorption and regeneration processes longer than normal at system startup in order to compensate for the large amounts of moisture retained by the adsorbent when the system was not operating for a more efficient system at startup.

6. **Claims 16-17** are rejected under 35 U.S.C. 103(a) as being unpatentable over Rhodes (US 4793143) in view of Takahashi et al. (US 5547018).

**Regarding claim 16**, Rhodes as modified teaches the invention as recited above but fails to explicitly teach that a system startup operation is terminated after a predetermined period of time elapsed since system startup.

However, Takahashi teaches in Fig. 7 an air conditioner having a control means (60) that has an operation start/stop judgment section (41) and a timer section (47). Takahashi further teaches that when the operation of the air conditioner is started the timer is switched (in step ST1) and when it has been determined that a predetermined time has passed, the next step (rotating the air adjusting plate) takes place (Col. 15, lines 15-34). Takahashi teaches that this configuration allows the heat exchangers to reach a suitable temperature for thermoregulating room air to a desired temperature, resulting in a more efficient air conditioner (Col. 15, lines 57-65).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to further modify the system of Rhodes to terminate startup operation after a predetermined period of time has elapsed since system startup in order to provide a more efficient air conditioning system in view of the teaching of the technique by Takahashi.

**Regarding claim 17**, Rhodes as modified teaches the invention as recited above but fails to explicitly teach that a system startup operation is terminated after a temperature difference between a target temperature of room air and a temperature of room air is equal to or below a predetermined temperature difference.

However, Takahashi teaches in Fig. 11 an air conditioner having a control means (80), start/stop judgment section (41) and a room temperature /set room temperature comparing section (50) for comparing a set room temperature and a real room temperature with each other (Col. 17, lines 21-25). Takahashi also teaches in Fig. 12 that if the difference between the set room temperature and the room temperature is equal to a positive value then the startup operation is terminated (air quantity adjusting plate is rotated; see ST3). Takahashi further teaches that this configuration performs room air conditioning so that a desired room temperature is kept (Col. 18, lines 12-16).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to further modify the system of Rhodes to terminate system startup after a temperature difference between a target temperature of room air and a temperature of room air is equal to or below a predetermined temperature difference in order to efficiently perform room air conditioning so that a desired room temperature is kept in view of the teaching of the technique by Takahashi.

7. **Claim 18** is rejected under 35 U.S.C. 103(a) as being unpatentable over Rhodes (US 4793143) in view of Manson et al. (US 5590831).

**Regarding claim 18**, Rhodes as modified teaches the invention as recited above but fails to explicitly teach that before a system startup operation starts, a temperature difference between a target temperature of room air and a temperature of room air is determined, and when the temperature difference between the target temperature of room air and the temperature of room air is equal to or below a predetermined temperature, the system startup operation is prevented from being performed.

However, Manson teaches in Fig. 10 an air conditioner having an auto cool setting wherein before system startup (air conditioner is off) a temperature difference between a target temperature of room air (set point) and a temperature of room air (temp.) is determined and when that difference is equal to 0°C the system startup operation is prevented from being performed (compressor off). A person of ordinary skill in the art at the time of invention would recognize that this configuration allows the system to operate only when needed in turn preventing over cooling of the air which wastes energy.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to further modify the system of Rhodes to determine a temperature difference between a target temperature of room air and a temperature of room air before a system startup operation starts, and when the temperature difference between the target temperature of room air and the temperature of room air is equal to or below a predetermined temperature, the system startup operation is prevented from being performed in order to prevent overcooling of the space and wasting energy in view of the teaching of the technique by Manson.

***Response to Arguments***

8. Applicant argues on pages 13 and 14 that the Rhodes, Worthington, Maeda, Belding, Takahashi, and Manson references taken alone or in combination does not disclose or suggest "a heat source side refrigerant circuit including a compression mechanism and a heat source side heat exchanger, *only the compression mechanism of the compression mechanism of the compression mechanism and the heat source side heat exchanger being used in common with the first and second utilization side refrigeration circuits.*" However, this argument has been considered but is not persuasive.

As noted in the rejection above, the recitation "*...only the compression mechanism of the compression mechanism of the compression mechanism and the heat source side heat exchanger being used in common with the first and second utilization side refrigeration circuits...*" has been considered a recitation of intended use of the claimed apparatus. Again, it has been held that the recitation with respect to the matter in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex part Masham*, 2 USPQ2d 1647 (1987). As previously discussed in the rejection above, the recitation "*...only the compression mechanism of the compression mechanism and the heat source side heat exchanger being used in common with the first and second utilization side refrigerant circuits...*" has been considered intended use because it is the Examiner's position that this recitation is only applicable when the system is in operation. Therefore, Rhodes as modified above meets the limitations of the apparatus claim as currently presented.

9. Applicant further argues on page 14 of the remarks that the remaining references cited do not account for the deficiencies of the Rhodes patent with respect to the independent claim 2. However, this argument has been considered but is not persuasive.

As discussed above the Rhodes reference as modified in the rejection above meet the limitations of the apparatus claim as currently presented and remains rejected as rejected above. Accordingly, dependent claims 4 and 9-18 remain rejected as rejected above.

### ***Conclusion***

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAKIYA ROGERS whose telephone number is (571)270-7145. The examiner can normally be reached on M-F: 8am to 4:30pm.



If attempts to reach the examiner by telephone are unsuccessful, please contact the examiner's supervisor, Cheryl Tyler at (571)272-4834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Lakiya Rogers/  
Examiner, Art Unit 3744

/Cheryl J. Tyler/  
Supervisory Patent Examiner, Art Unit  
3744